Claims

We claim:

1. A purified antibody for modulating a biological activity of a malignant cell that expresses a frizzled receptor, wherein said antibody specifically binds to at least one epitope in an extracellular domain of the frizzle receptor expressed on the malignant cell.

2. The purified antibody of claim 1, wherein the extracellular domain comprises an amino terminal peptide fragment of the frizzled receptor.

3. The purified antibody of claim 1 further comprising an antibody fragment having an antigen binding region that specifically binds to the epitope.

4. The purified antibody of claim 1, wherein the antibody is capable of sensitizing malignant cells expressing the frizzled receptor to a cytotoxic factor.

5. The purified antibody of claim 1, wherein the antibody inhibits binding of a Wnt ligand to the frizzled receptor.

6. The purified antibody of claim 1 further comprising a detectable label.

7. The purified antibody of claim 1, wherein the antibody is a human antibody.

8. The purified antibody of claim 1, wherein the antibody is a monoclonal antibody.

9. The purified antibody of claim 1, wherein the antibody binds to a frizzled-2 receptor amino terminal extracellular domain.

10. The purified antibody of claim 1, wherein the frizzled receptor amino terminal extracellular domain has a sequence that is greater than 80% homologous to an amino acid sequence selected from the group Seq. ID No.s 61, 63, 64, 66, 68, 69, 71, 73, 75 and 77.

11. An isolated nucleic acid, comprising at least one nucleotide fragment encoding a peptide having an amino acid sequence that is greater than 80% homologous to an amino acid sequence selected from the group Seq. ID No.s 61, 63, 64, 66, 68, 69, 71, 73, 75 and 77.

12. The isolated nucleic acid of claim 11, further comprising at least one nucleotide fragment encoding a T cell epitope .

13. A transgenic non-human animal, comprising at least one isolated nucleic acid of claim 11.

14. A recombinant vector, comprising at least one nucleic acid according to claim 11 functionally attached to a promoter region upstream of the nucleic acid.

15. A host cell comprising at least one recombinant vector according to claim 14.

16. A pharmaceutical composition comprising a purified antibody for modulating a biological activity of a malignant cell that expresses a frizzled receptor, wherein said antibody specifically binds to at least one epitope in an extracellular domain of the frizzle receptor expressed on the malignant cell, in a pharmaceutically acceptable carrier.

17. A method for modulating a biological activity of a malignant cell that expresses a frizzled receptor comprising administering a pharmaceutical composition comprising a purified antibody for modulating a biological activity of a malignant cell that expresses a frizzled receptor, wherein said antibody specifically binds to at least one epitope in an extracellular domain of the frizzle receptor expressed on the malignant cell, in a pharmaceutically acceptable carrier.

18. A frizzled receptor epitope conjugate comprising at least one epitope in an extracellular domain of the frizzle receptor expressed on a malignant cell and at least one epitope specific to a T cell antigen.

19. The conjugate of claim 18, wherein the T cell antigen is also an epitope in an extracellular domain of the frizzle receptor expressed on a malignant cell

20. The conjugate of claim 18 further comprising a linker moiety.

21. The conjugate of claim 20, wherein the linker is GPSL.

22. A pharmaceutical composition useful as a vaccine against malignancy for administration to a patient having a predisposition for the malignancy, comprising a purified antibody for modulating a biological activity of a malignant cell that expresses a frizzled

receptor, wherein said antibody specifically binds to at least one epitope in an extracellular domain of the frizzle receptor expressed on the malignant cell.

23. A method of immunizing a subject against a malignancy comprised of malignant cells that express a frizzled receptor, said method comprising the steps of:

a) identifying an antibody for modulating a biological activity of the malignant cell that expresses a frizzled receptor, wherein said antibody specifically binds to at least one epitope in an extracellular domain of the frizzle receptor expressed on the malignant cell; and

b) administering the antibody in a pharmaceutically acceptable carrier in an amount sufficient to inhibit the malignancy.

24. A method of treating a subject with a malignancy comprised of malignant cells that express a frizzled receptor, said method comprising the steps of::

a) identifying an antibody for modulating a biological activity of the malignant cell that expresses a frizzled receptor, wherein said antibody specifically binds to at least one epitope in an extracellular domain of the frizzle receptor expressed on the malignant cell; and

b) administering the antibody in a pharmaceutically acceptable carrier in an amount sufficient to modulate a biological activity of the malignant cell.

25. An assay for identifying a frizzled receptor expressed by a malignant cell, wherein said frizzled receptor comprises at least one epitope in an extracellular domain, comprising the steps of:

a) identifying an antibody that specifically binds to the epitope;

b) exposing a sample of cells suspected of expressing the frizzled receptor to the antibody; and

c) determining the extent of binding of the antibody to the cells.

26. A screening assay for identification of small molecules that modulate frizzled receptor activity, comprising:

a) selecting a library of the small molecules comprising a plurality of different chemical structures;

b) contacting the small moleucles with an extracellular domain of a frizzled receptor which is capable of binding to its corresponding Wnt protein; and

c) measuring binding of a ligand to the frizzled receptor in the presence of the small molecule, wherein the ligand is selected from the group consisting of the small molecule, the Wnt protein, and an antibody to the extracellular domain of the frizzled receptor.